

# ETCAP: Estimating Cost Savings of Innovative Technologies

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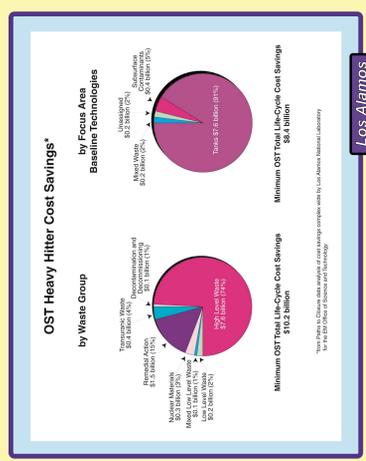
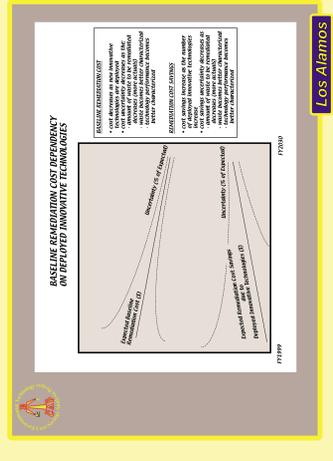
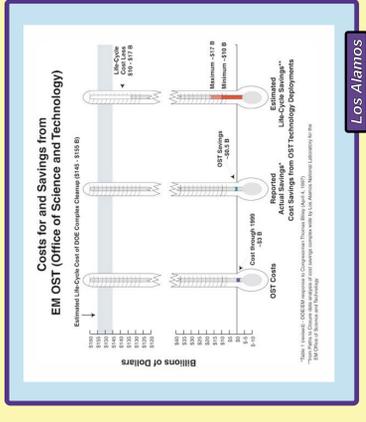
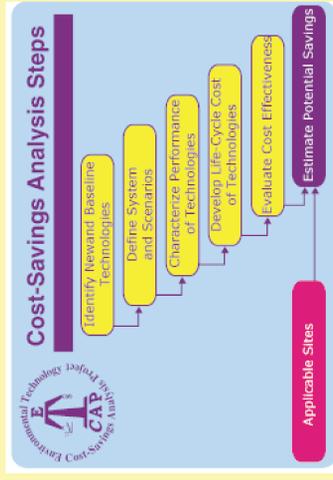
<http://www.lanl.gov/orgs/d/d4/enviro/etcap.html>

Los Alamos

## ESTIMATING COMPLEX-WIDE SAVINGS:

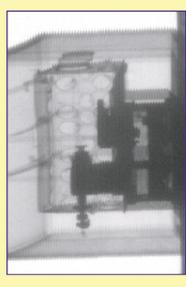
- OBJECTIVES:**
  - Unbiased economic analyses of specific environmental technologies that are proposed for use within the DOE complex
  - Support the U.S. Department of Energy's Office of Science and Technology (OST) in their efforts to evaluate environmental technologies to accelerate cleanup, reduce risk, increase efficiency, and track costs of remediation activities
- ACCOMPLISHMENTS OVER THE LAST 10 YRS:**
  - Over 100 publications provided for U.S. Department of Energy and professional journals since the inception of OST in 1990
  - Experience and independent integrity to coordinate disparate federal agencies and facilitate interagency communication
  - Diverse team of experts in economics, environmental modeling and analysis systems at Los Alamos National Laboratory
  - Synergism with other highly advanced environmental modeling and analysis systems at Los Alamos National Laboratory

## METHODOLOGY AND TRENDS IN THE RESULTS TO-DATE:



## EXAMPLES:..... DVRS .....

- The "Accelerated Site Technology Deployment Plan for the Decontamination and Volume Reduction System (DVRS), Revision 1," dated June 1998, projects a potential \$168 million cost savings due to the use of DVRS at Los Alamos National Laboratory (LANL) for decontamination and volume reduction of 5400 cubic meters oversized metal transuranic (TRU) waste from legacy waste and facility upgrades. An independent study was conducted by the LANL Environmental Technology Cost-Savings Analysis Project (ETCAP) team to review the cost savings reported in the 1998 Accelerated Site Technology Deployment Plan. It was concluded by way of this independent review that:
  - Use of the DVRS will generate life-cycle cost savings of \$102 million. The degree of confidence in the life-cycle cost savings is high.
  - The DVRS at LANL is an enabling technology for approximately 2400 cubic meters of oversized metal TRU waste stored in fiberglass reinforced plywood (FRP) crates. The most prominent cost savings from DVRS (approximately \$78 million) will be gained through volume reduction of TRU waste sent to the Waste Isolation Pilot Plant (WIPP).
  - DVRS processing will reduce storage and processing time for the total 5400 cubic meters of LANL oversized metal TRU waste by approximately 12 years and reduce the total on-site storage period by approximately 6 years.



An X-ray image of this FRP crate reveals the metal contents and the unused space (Loughhead, 2000).



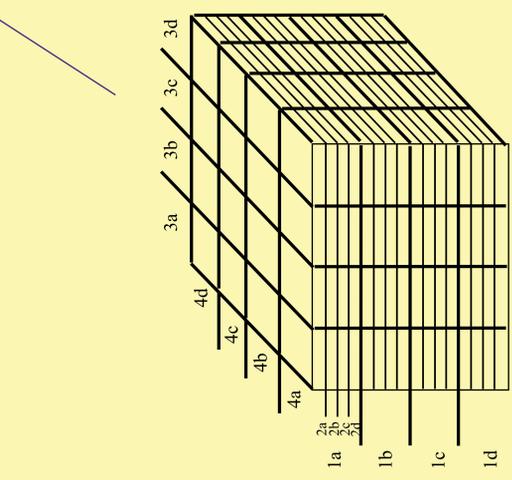
June 2000 photo of the DVRS facility under construction. The blue compactor was purchased with EM-50 funds.

	Baseline	DVRS Scenario 1 (pack aged in 55 gallon drums)	DVRS Scenario 2 (pack aged in standard waste box)	Average of DVRS Scenarios 1 and 2
Total Life-Cycle Costs (constant dollars)	\$147 million	\$51 million	\$40 million	\$45 million
Total Life-Cycle Costs (1998 net present value)	\$107 million	\$42 million	\$34 million	\$34 million
Potential Life-Cycle Cost Savings (constant dollars)		\$96 million	\$107 million	\$102 million
Potential Life-Cycle Cost Savings		\$65 million	\$73 million	\$69 million

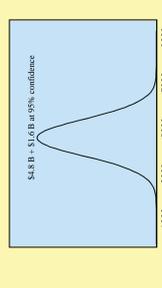
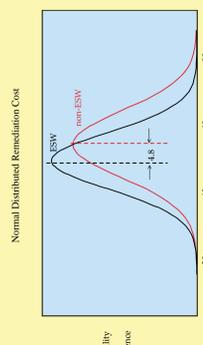
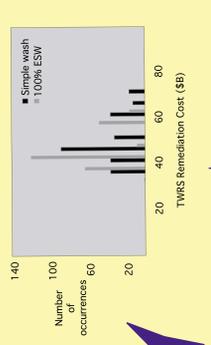
Deactivation & Decommissioning Focus Area

## SLUDGE WASHING COST SAVINGS FOR TANKS

It has been estimated that implementation of ESW in the Tank Waste Remediation System (TWRS) at the Hanford site can save approximately \$4.8 B over the use of a simpler water wash. The simpler water wash dissolution was defined as achieving 85% that of ESW dissolution. It was further estimated that based on the water wash comparison, the \$4.8 B savings was uncertain within + \$1.6 B at the 95% confidence interval. While some confusion has arisen due to the fact that ESW has already been included in the TWRS remediation baseline at Hanford, and hence an additional site cost savings cannot be realized, the ESW cost savings is reported here to take credit for the ~\$30 M invested in ESW technology development.



Remediation Cost Outcomes of Equal Probability of Occurrence



The uncertainty for the difference between the uncertainty for the uncertainty interval can be calculated at the 95% confidence interval by  $\sigma_{diff} = \sqrt{\sigma_{ESW}^2 + \sigma_{SW}^2}$  when  $n = \#$  of occurrences  $\sigma_{diff} = \frac{1}{\sqrt{n}} \sqrt{\sigma_{ESW}^2 + \sigma_{SW}^2}$   $\sigma_{diff} = \frac{1}{\sqrt{100}} \sqrt{(\$1.6B)^2 + (\$1.6B)^2}$   $\sigma_{diff} = \frac{1}{10} \sqrt{2 \times (\$1.6B)^2}$   $\sigma_{diff} = \frac{1}{10} \times \sqrt{2} \times \$1.6B$   $\sigma_{diff} = 0.226 \times \$1.6B$   $\sigma_{diff} = \$0.362B$

ETCAP TANKS FOCUS AREA

Environmental Assessment

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